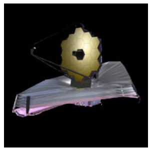

1442 - Time Series Stability Verification

Cycle: 0, Proposal Category: COM/NIRCAM

INVESTIGATORS

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OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Observation Folder				
	1	CAR NIRCam-33: Time Series Stability Verification	NIRCam Grism Time Series	(1) HAT-P-14
	2	NRC-33 Secondary Target	NIRCam Grism Time Series	(2) WASP-18
	3	TSO Grism + WL offsets calibration	NIRCam Engineering Imaging	(1) HAT-P-14

ABSTRACT

One of JWST's key science themes, Planetary Systems and the Origins of Life, will depend on the spectroscopic characterization of planet atmospheres. The atmospheres of transiting planets will be characterized during primary transit, secondary eclipse and phase curves using time series modes. The signal due to planet atmospheres is much smaller than the star, with typical ratios of ~100 ppm or smaller. It is therefore important to

achieve high precision time series with standard deviations smaller than 100 ppm after correcting known effects. This test will include a time series of a high-mass hot Jupiter transit to assess this signal and as well as verify the change in flux due to a known signal with a known ephemeris.

OBSERVING DESCRIPTION

We will observe a transiting system with a known ephemeris and signal size in the grism time series mode. NIRISS/SOSS will observe the same system as well. The cross-instrument advantages are the short-wavelength photometry with NIRCam which will overlap with NIRISS/SOSS allowing an absolute transit depth comparison. The other advantage is that the NIRCam spectroscopic observations will help resolve the HAT-P-14b diluting companion.

The grism time series allows a simultaneous short wavelength photometric time series. To achieve the maximum precision, a +8 Weak Lens will be used in concert with the long wavelength grism with a F322W2 filter.

These observations are for NIRCam grism time series observations, to observe a single transit of the high-mass hot Jupiter HAT-P-14b. Since a transit of HAT-P-14b is 2.2 hours long, this will require 4.4 hours of science observations. We have also included an additional 1.45 hours of observing time at the start of the observations to test the settling timescale, for a total science time of 5.85 hours. This gives a total time of 6.8 hours with overheads. A point to note is that these observations would require time on either side of an eclipse to establish a baseline flux for the primary star, which is done most efficiently if one observes an equal amount of time in- and out-of-eclipse – hence a nominal 4.4 hours total to observe a 2.2 hour eclipse.

The observations themselves would try to replicate the instrument setup for an actual exoplanet observation. Therefore we would use the subgrism128 subarray, four output channels, and the F322W2 filter. We will observe the tranist using a single 6.0 hour exposure in the BRIGHT2 read-out mode.

Proposal 1442 - Targets - Time Series Stability Verification

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HAT-P-14	RA: 17 20 27.8813 (260.1161721d) Dec: +38 14 31.81 (38.24217d) Equinox: J2000	Proper Motion RA: 1.9947333570252975E-4 sec of time/yr Proper Motion Dec: -0.0066790000346372835 arcsec/yr Parallax: 0.0044623" Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. V=9.9 K=8.9 Category=Star Description=[Exoplanet Systems, F dwarfs] Extended=NO				
(2)	WASP-18	RA: 01 37 25.0709 (24.3544621d) Dec: -45 40 40.06 (-45.67779d) Equinox: J2000	Proper Motion RA: 0.002423955771882309 sec of time/yr Proper Motion Dec: 0.020479 arcsec/yr Parallax: 0.008" Epoch of Position: 2015.5	
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Category=Star Description=[Exoplanet Systems, F dwarfs] Extended=NO				

Observation

Proposal 1442, Observation 1: CAR NIRCam-33: Time Series Stability Verification Sun May 01 23:00:12 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRCam Grism Time Series

Diagnostics

(CAR NIRCam-33: Time Series Stability Verification (Obs 1)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.

(Visit 1:1) Warning (Form): Data Excess over lower threshold

(Visit 1:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HAT-P-14	RA: 17 20 27.8813 (260.1161721d) Dec: +38 14 31.81 (38.24217d) Equinox: J2000	Proper Motion RA: 1.9947333570252975E-4 sec of time/yr Proper Motion Dec: -0.0066790000346372835 arcsec/yr Parallax: 0.0044623" Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
V=9.9
K=8.9
Category=Star
Description=[Exoplanet Systems, F dwarfs]
Extended=NO

Acquisition

#	Target	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	SUB32TATSGRISM	F335M	RAPID	9	1	1	0.152	85410

Template

Subarray	No. of Output Channels
SUBGRISM128	4

Spectral Elements

#	Short Pupil+Filter	Long Pupil+Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	WLP8+F210M	GRISMR+F322W2	BRIGHT2	20	780	1	780	21621.514	85483

Proposal 1442 - Observation 1 - Time Series Stability Verification

Special Requirements	
	Phase 0.9645358 to 0.973540 with period 4.6276623 Days and zero-phase 2455421.35484 HJD Aperture PA Range 55 to 100 Degrees (V3 54.77419611 to 99.77419611) Aperture PA Range 205 to 232 Degrees (V3 204.77419611 to 231.77419611) Aperture PA Range 242 to 248 Degrees (V3 241.77419611 to 247.77419611) Aperture PA Range 255 to 320 Degrees (V3 254.77419611 to 319.77419611) Time Series Observation No Parallel Sequence Observations 1, 3, Non-interruptible Same Aperture PA 1, 3

Observation

Proposal 1442, Observation 2: NRC-33 Secondary Target

Sun May 01 23:00:12 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRCam Grism Time Series

Diagnostics

(NRC-33 Secondary Target (Obs 2)) Warning (Form): Exposure Duration exceeds the limit of 10000.0 seconds. Above this limit it is possible that a High Gain Antenna move may occur during the exposure.

(Visit 2:1) Warning (Form): Data Excess over lower threshold

(Visit 2:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(2)	WASP-18	RA: 01 37 25.0709 (24.3544621d) Dec: -45 40 40.06 (-45.67779d) Equinox: J2000	Proper Motion RA: 0.002423955771882309 sec of time/yr Proper Motion Dec: 0.020479 arcsec/yr Parallax: 0.008" Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Category=Star
Description=[Exoplanet Systems, F dwarfs]
Extended=NO

Acquisition

#	Target	Subarray	Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	SAME	SUB32TATSGRISM	F335M	RAPID	5	1	1	0.092	85483

Template

Subarray	No. of Output Channels
SUBGRISM128	4

Spectral Elements

#	Short Pupil+Filter	Long Pupil+Filter	Readout Pattern	Groups/Int	Integrations/Exp	Exposures/Dith	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	WLP8+F210M	GRISMR+F322W2	BRIGHT2	11	1390	1	1390	21617.878	85483

Proposal 1442 - Observation 2 - Time Series Stability Verification

Special Requirements	
	Phase 0.8276740322 to 0.8719318982334345 with period 0.9414526 Days and zero-phase 2458375.169883 HJD Aperture PA Range 85 to 137 Degrees (V3 84.77419611 to 136.77419611) Aperture PA Range 150 to 165 Degrees (V3 149.77419611 to 164.77419611) Aperture PA Range 172 to 237 Degrees (V3 171.77419611 to 236.77419611) Aperture PA Range 247 to 255 Degrees (V3 246.77419611 to 254.77419611) Aperture PA Range 263 to 317 Degrees (V3 262.77419611 to 316.77419611) Aperture PA Range 330 to 75 Degrees (V3 329.77419611 to 74.77419611) Time Series Observation No Parallel On Hold Secondary target to be used if HAT-P-14 is not visible to JWST.

Proposal 1442 - Observation 3 - Time Series Stability Verification

Observation

Proposal 1442, Observation 3: TSO Grism + WL offsets calibration Sun May 01 23:00:12 GMT 2022

Diagnostic Status: Warning

Observing Template: NIRCam Engineering Imaging

Comments: This is a test to calibrate the offsets between direct imaging, weak lens imaging and grisms to better prepare a SIAF update.

Diagnostics

(TSO Grism + WL offsets calibration (Obs 3)) Warning (Form): The selected fiducial point is not a standard option for the instrument.

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(1)	HAT-P-14	RA: 17 20 27.8813 (260.1161721d) Dec: +38 14 31.81 (38.24217d) Equinox: J2000	Proper Motion RA: 1.9947333570252975E-4 sec of time/yr Proper Motion Dec: -0.0066790000346372835 arcsec/yr Parallax: 0.0044623" Epoch of Position: 2015.5	

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
V=9.9
K=8.9
Category=Star
Description=[Exoplanet Systems, F dwarfs]
Extended=NO

Template

Module	Subarray
A	SUBGRISM256

Dithers

#	Primary Dither Type	Primary Dithers	Subpixel Dither Type	Dither Size	Subpixel Positions
1	NONE		STANDARD		1

Spectral Elements

#	Short Pupil	Long Pupil	Short Filter	Long Filter	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Dithers	Total Exposure Time	ETC Wkbk.Calc ID
1	WLP8	F405N	F210M	F444W	RAPID	2	2	2	1	31.93	
2	WLP8	GRISMR	F187N	F322W2	RAPID	5	2	2	1	63.819	
3	CLEAR	GRISMR	WLP4	F444W	RAPID	5	2	2	1	63.819	
4	CLEAR	CLEAR	F212N	F335M	RAPID	2	2	2	1	31.93	

Special Requirements	
Special Requirements	Offset -10.0 arcsec, 0.0 arcsec Fiducial Point Override NRCA5_GRISM256_F322W2 Sequence Observations 1, 3, Non-interruptible Same Aperture PA 1, 3